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PATENT

Case 876P020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of ) Examiner: Helen Pratt  
James H. Keithly )  
Harold Pollack ) Group Art Unit: 1761  
Thomas Taggart )  
EARLY SEASON NOT FROM CONCENTRATE )  
ORANGE JUICE )  
Serial No. 09/311,956 )  
Filed: May 14, 1999 )

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DECLARATION OF THOMAS TAGGART

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

I, Thomas Taggart, do hereby declare as follows:

1. I am a citizen of the U.S.A., I am employed as an Agricultural Scientist, of the company which is the proprietor of the above-captioned application, and my employment with this company began in May, 1996.

2. I hold a B.S. degree in Biology, with emphasis in Botany (1990) from California State University at Sonoma located in Cotati, California.

3. I am a co-inventor of the above-captioned application, and I have obtained extensive experience in food, beverage and agricultural products and in processes and methods related to such products, both prior to and during my employment with the proprietor of the above-captioned application, such prior

employment including my previous experience as a Government Agricultural Biologist cooperating with the California Department of Food and Agriculture and with the U.S. Department of Agriculture.

4. I have been informed that certain claims of the above-captioned application have been rejected as being unpatentable over Chenchin, et al U.S. Patent No. 6,007,863, Wu, et al U.S. Patent No. 5,468,508 or Houghtaling, et al U.S. Patent No. 3,227,562, in view of Nelson, et al and Moore; I have participated in conducting certain tests discussed herein; and I am aware that this Declaration and these tests are offered in support of the patentability of the thus rejected claims.

5. Tests referred to in paragraph 4 were conducted in order to compare color values, chemical properties and sensory properties of juices obtained from oranges very early in the harvest season for orange trees in the territory of their growth, namely in Florida, U.S.A. The oranges were from five different orange tree cultivars. One type of fruit used in these tests is the Hamlin orange, while the other four cultivars were orange cultivars referenced in the above-captioned application.

6. Although all the tests reported and discussed in this Declaration are not directly aligned with the three principal references, I believe that these tests provide a commercially important comparison with more directly relevant prior art, namely

the use of Hamlin juice as an early season juice. As such, these tests are more directly related to the secondary references, which do relate to seasonal orange cultivars and blends of juices of different orange cultivars. To the extent that the primary references are relevant to orange juices, this relevance is largely with respect to chemical properties in some of the application claims, for example Brix: acid ratio (BAR), which chemical properties are treated in this Declaration. Regarding the general teachings of the cited references concerning color and flavor, in my professional experience the tests noted in this Declaration compare prior art closer to our claimed invention than that of the primary and/or secondary references, namely the use of Hamlin as the standard early season orange cultivar for orange juice products. This includes blends of Hamlin juice with other juices.

7. As background, and as discussed in the introductory pages of the above-captioned application, the Hamlin round orange cultivar currently is the principal early season variety which is used in the juice processing industry. Prior to our invention, it had been generally known to blend Hamlin-originating orange juice with other orange juice sources, including stored Valencia orange juice.

8. My colleagues and I came to conclude that a real-world negative aspect of orange juice products which incorporate

substantial quantities of early season harvested juices, principally Hamlin juices, is the low Color Number associated with early season orange juice products. Accordingly, we embarked on a project to enhance color, i.e. provide early season juices having a deeper orange color than that of the standard and currently principally used early seasoned orange, namely Hamlin orange juice. At that time, we hoped to avoid detrimentally affecting the chemical properties and the sensory properties of juices which we sought to enhance in color.

9. Numerous orange cultivars were available. As an example of some of the available orange cultivars, reference is made to a report regarding the Experimental Station of Limeira, in Brazil. A copy of this report and an English translation of it is referenced in the Information Disclosure Statement of the above-captioned application. The English translation has the title "Study of Some Characteristics of Fruit and Seeds of Various Kinds of Sweet Orange, *Citrus sinensis* (L.) Osbeck." Of the numerous cultivar varieties available we selected cultivars which we hoped would give good deep orange color during a harvest season no later than that of Hamlin oranges in a particular growing territory. Through our efforts, as noted in the above-captioned application, we determined that at least four cultivar varieties exhibited Color Number values greater than those of Hamlin. We also determined that these cultivars achieved this color advantage

within a seasonal time frame no later than that of Hamlin oranges harvested during the same harvest season in the same geographical territory. This is an important advance in industrial-scale commercial production of orange juice products. We determined that consumers as a whole judge that a lower quality product is indicated by an orange juice product having a less intense orange color than later season originating orange juice products, especially those originating from Valencia oranges.

10. The above-captioned application reports on tests of five cultivars. These tests show that, except for very early season Westin orange juice, the Ruby Nucellar cultivar juice, the Westin cultivar juice and the two juices within the Seleta cultivar family, namely Seleta de Itaborai and Seleta Vermelha had a Color Number value greater than that of the Hamlin cultivar juice, during identical harvest time frames. The data in this regard is aptly summarized in FIG.3, in FIG.7, and in FIG.10 of the above-captioned application. In most cases, the Color Number advantage is at least 1 Color Number unit over the Hamlin juice, in some instances the advantage being 2 Color Number units or more. Through research by my colleagues, it has been determined that a Color Number increase of 1 Color Number unit is readily perceived by orange juice consumers and is recognized as a substantial quality advantage.

11. In my experience and training, an early season color advantage such as that referred to in paragraph 10 of this Declaration is not directly tied to having other advantageous orange juice attributes, namely chemical properties and sensory attributes. The early season cultivar processes and juice products claimed in the above-captioned application have been found not only to maintain good chemical and sensory attributes, but also to achieve chemical and sensory attributes which are enhanced when compared with Hamlin products, the well-recognized early season standard. These advances are reported in the above-captioned application and in this Declaration primarily in terms of greater Brix and BAR chemical analysis values and enhanced sensory attributes. According to my experience and training, these are advances which would not be expected to result because of enhanced color.

12. Concerning the chemical attribute of Brix, except for very early season instances, which are pre-harvest time periods, the Brix values for the four early season cultivars reported upon in the above-captioned application and in this Declaration are, in almost every instance, greater than the corresponding Hamlin juice Brix values. See, for example, FIG.1, FIG.4 and FIG.8 of the above-captioned application.

13. Reference is made to FIG.2, FIG.6 and FIG.9 of the above-captioned application. The test data summarized by these

figures illustrate the BAR progression advantage of the claimed invention when compared with the Hamlin early season standard of the industry.

14. Important commercial significance of the BAR progression advantage noted in paragraph 13 is illustrated in FIG.11 and FIG.12 of the above-captioned application. The cross-hatched areas represent the BAR orange standard information during the earliest season time frame. These illustrations indicate that the BAR orange standard is met by the cultivars of the invention at a significantly earlier date than do the Hamlin juices. This represents a potential advantage of allowing for an even earlier season harvest in order to thereby lengthen the harvest season for round oranges. This is an advantage in addition to and unexpected from the color enhancement illustrated by the cultivars of the invention.

15. Sensory evaluations are reported in Example 4 of the above-captioned application. These data indicated that the invention provides overall quality scores for unblended juices which are at least comparable to those of the Hamlin variety, which indicates that substitution of these cultivars for Hamlin did not negatively impact the sensory evaluation. Additional sensory testing, which is reported in this Declaration, of actual blends of the early season juices according to the invention with the Hamlin early season juice indicates that the early season

cultivars of the invention actually provide enhanced sensory attributes.

16(a). Blends of Hamlin juice with 10%, 30% or 60% of a Selta de Itabori, Selta Vermelha (Earlygold), Ruby Nucellar and Westin early season juices were made up and subjected to sensory evaluation. Color and chemical analysis results are summarized in the following Table I.

TABLE I

<u>VARIETY</u>	<u>DATE</u>	<u>BRIX</u>	<u>ACID</u>	<u>BAR</u>	<u>COLOR</u>	<u>OIL</u>	<u>VIT C</u>
HAMLIN	14 - Oct	8.63	0.91	9.48	33.7	0.004	44.02
WESTIN	14 - Oct	9.07	0.86	10.55	34.6	0.004	35.17
RUBY	14 - Oct	8.84	0.71	12.45	35.5	0.009	35.14
VERMELHA (Earlygold)	14 - Oct	9.64	0.80	12.05	35.3	0.009	40.80
ITABORAI	14 - Oct	9.37	0.87	10.77	35.8	0.012	37.90

16(b). Color and chemical data for the blends referred to in paragraph 16(a) are reported in the following TABLE II.

TABLE II

<u>VARIETY</u>	<u>DATE</u>	<u>BRIX</u>	<u>ACID</u>	<u>BAR</u>	<u>COLOR</u>	<u>VIT C</u>
HAMLIN	14 - Oct	8.63	0.91	9.48	33.7	44.02
10% WESTIN	14 - Oct	8.56	0.92	9.30	33.9	42.97

<b>30% WESTIN</b>	" "	8.73	0.92	9.49	34.0	42.72
<b>60% WESTIN</b>	" "	8.89	0.92	9.66	34.3	40.93
<b>10% RUBY</b>	" "	8.58	0.91	9.43	34.0	43.16
<b>30% RUBY</b>	" "	8.41	0.83	10.13	34.5	40.77
<b>60% RUBY</b>	" "	8.51	0.77	11.05	34.9	38.23
<b>10% EARLYGOLD</b>	" "	8.55	0.89	9.61	34.1	43.66
<b>30% EARLYGOLD</b>	" "	8.89	0.86	10.34	34.4	42.91
<b>60% EARLYGOLD</b>	" "	9.15	0.83	11.02	34.9	42.11
<b>10% ITABORAI</b>	" "	9.45	0.92	9.18	34.1	43.14
<b>30% ITABORAI</b>	" "	8.64	0.90	9.60	34.5	42.14
<b>60% ITABORAI</b>	" "	8.91	0.89	10.01	35.0	59.46

16(c). The blends of Itaborai and Hamlin juices which are specified in paragraph 16(a) were evaluated by a trained sensory panel using descriptive sensory analysis. Each blend was compared with 100% Hamlin juice as the control.

The addition of the Itaborai juice at all blend levels was found by the panel to have a significant reduction in green character. For the control, the green character value was 1.4. For the 10% Itaborai and 90% Hamlin blend, the green character value was 1.1. For the blend of 30% Itaborai and 70% Hamlin, the green character value was 1.0. For the blend of 60% Itaborai and 40% Hamlin, the green character value was 1.1. Each blend had a statistically significantly lower green character when

compared with the all-Hamlin control, which is a sensory enhancement. The P-Value was 0.08.

Bitterness sensory evaluations were 1.2 for the control, 1.1 for the 10% Itaborai, 1.0 for the 30% Itaborai, and 1.3 for the 60% Itaborai. Bitterness was significantly lower with 30% Itaborai juice in the blend, which is a sensory enhancement. The P-Value was 0.03.

16(d). The blends of Earlygold and Hamlin juices which are specified in paragraph 16(a) were evaluated by the sensory panel using the descriptive sensory analysis. Each blend was compared with 100% Hamlin juice as the control.

The addition of the Earlygold juice was found by the panel to increase the total orange characteristic with increasing Earlygold percentages, which is a desirable sensory effect. The total orange values were 3.5, 3.5, 3.7 and 3.8 for the juices having 0%, 10%, 30% and 60%, respectively, of Earlygold juice, the P-Value being 0.10.

The addition of the Earlygold juice was found by the panel to decrease the raw orange (fresh orange) characteristic at 10% and 30% Earlygold, while the raw orange characteristic was found to increase at 60% Earlygold juice in the blend. The raw orange values were 1.7, 1.6, 1.5 and 1.8 for the juices having 0%, 10%, 30% and 60%, respectively, of Earlygold juice, the P-Value being 0.24. Regression analysis results for these data indicate a

positive raw orange sensory effect at somewhat less than 30% Earlygold juice in the blend.

The addition of the Earlygold juice was found by the panel to increase the bitterness characteristic at 10% and 30% Earlygold, while the bitterness characteristic was found to decrease at 60% Earlygold juice in the blend. The bitterness values were 1.0, 1.2, 1.2 and 0.8 for the juices having 0%, 10%, 30% and 60%, respectively, of Earlygold juice, the P-Value being 0.05. Regression analysis results for these data indicate a positive bitterness sensory effect (i.e. reduced bitterness) at somewhat less than 30% Earlygold juice in the blend.

16(e). The blends of Ruby Nucellar and Hamlin juices which are specified in paragraph 16(a) were evaluated by the sensory panel using the descriptive sensory analysis. Each blend was compared with 100% Hamlin juice as the control.

The addition of the Ruby Nucellar juice was found by the panel to decrease the feeling factors characteristic with increasing Ruby Nucellar percent, which is a desirable effect. The feeling factors values were 1.8, 1.8, 1.7 and 1.6 for the juices having 0%, 10%, 30% and 60%, respectively, of Ruby Nucellar juice, the P-Value being 0.42.

The addition of the Ruby Nucellar juice was found by the panel to decrease the sourness characteristic with increasing Ruby Nucellar percent, which is a desirable effect. The sourness

values were 4.0, 4.0, 3.9 and 3.7 for the juices having 0%, 10%, 30% and 60%, respectively, of Ruby Nucellar juice, the P-Value being 0.41.

The blends with 30% and 60% Ruby Nucellar juice had a significant reduction in green character, a positive sensory effect. For the control, the green character value was 1.4. For the 10% Ruby Nucellar and 90% Hamlin blend, the green character value was 1.0. For the blend of 30% Ruby Nucellar and 70% Hamlin, the green character value was 0.9. For the blend of 60% Ruby Nucellar and 40% Hamlin, the green character value was 0.8. The 30% and 60% blends each had a statistically significantly lower green character when compared with the all-Hamlin control. The P-Value was 0.02.

The blends with 10% and 30% Ruby Nucellar juice had a significant reduction in chemical notes, which is a sensory enhancement. For the control, the chemical character value was 1.0. For the 10% Ruby Nucellar and 90% Hamlin blend, the chemical character value was 0.6. For the blend of 30% Ruby Nucellar and 70% Hamlin, the chemical notes value was 0.6. For the blend of 60% Ruby Nucellar and 40% Hamlin, the chemical notes value was 0.8.

In addition, the 10% and 30% blends of Ruby Nucellar juice with Hamlin juice each had a statistically significantly lower green character when compared with the all-Hamlin control.

The P-Value was 0.01. Microbiological character and cooked orange character increased with increasing percent of Ruby Nucellar juice, which indicates there may have been some spoilage in the Ruby Nucellar base juice.

16(f). The blends of Westin and Hamlin juices which are specified in paragraph 16(a) were evaluated by the sensory panel using the descriptive sensory analysis. Each blend was compared with 100% Hamlin juice as the control. The addition of the Westin juice at all blend levels was found by the panel to have a reduction in green character. For the control, the green character value was 1.2. For the 10% Westin and 90% Hamlin blend, the green character value was 0.8. This improvement of green character reduction was statistically significant. The P-Value was 0.04. For the blend of 30% Westin and 70% Hamlin and for the blend of 60% Westin and 40% Hamlin, the green character value in each case was 1.0.

17. From the above, it is my professional conclusion that the data referenced in this Declaration show that cultivars employed in the above-captioned application bring about an unexpected and serendipitous combination of enhanced color, improved Brix and BAR, and better sensory qualities when compared with processes and juices according to the prior art as discussed in this Declaration.

18. I hereby declare that all statements made herein and of my knowledge are true and that all statements made on information and belief are believed to be true; and I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therefrom.

Dated: April 19, 2000

Thomas Taggart  
Thomas Taggart